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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/520,141

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Shigehiro Nishino

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11/26/2007

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EXAMINER

SONG, MATTHEW J

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

11/26/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/520,141

Applicant(s)

NISHINO ET AL.

Examiner

Matthew J. Song

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 5, recites "planarly placing a small diameter a-SiC single crystal wafer previously formed as a wafer on a graphite plate and simultaneously masking a surface of a substrate" in lines 2-4. There is no support in the original disclosure for "simultaneously masking the surface." The original disclosure at most supports SiC placement then masking, not simultaneously placing and masking.

3. Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 5, recites "polycrystal SiC around an outer circumference of said wafer from its masking

plane side and integrating them” in lines 6-7. There is no support in the original disclosure for “integrating them.” The original does not teach any integration step.

4. Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 5 recites, “planarly forming a film of polycrystal SiC around an outer circumference of said wafer from its masking plane side and integrating them; and thereafter grinding” in lines 4-7. There is no support in the original disclosure for the claimed features. The original disclosure does not teach planarly forming a film around a circumference. The film formed is not planar until after grinding, note applicant’s Figure 1(2) and 1(3).

5. Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 5 recites, “planarly forming a film of polycrystal SiC around an outer circumference of said wafer from its masking plane side and integrating them; and thereafter grinding” in lines 4-7. The claim is not enabled because the original disclosure does not teach how to planarly form a film around an outer circumference of the wafer because the film is blanket deposited over the wafer and the mask layer, thus the

film around the circumference of the wafer is sloped due to the presence of the raised surface of the wafer and mask relative to the underlying graphite, as evidenced by Applicant's Figure 1(2).

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 5, recites "polycrystal SiC around an outer circumference of said wafer from its masking plane side and integrating them" in lines 6-7. It is unclear what "them" and "its" refers to.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanino et al (US 6,203,772).

Tanino et al discloses an α -SiC substrate 1 and growing a polycrystalline β -SiC 2 so as to form an end portion 2e over the whole periphery of the side face of the single crystal α -SiC

substrate 1 (col 3, ln 25-55 and Fig 1-2), this reads on applicant's planarly forming a film polycrystalline SiC in a flat shape around an outer circumference of a small diameter single crystal α -SiC wafer because the SiC layer 2 extends beyond the outer circumference of wafer 1 and the film is planarly flat in Fig 2. Tanino et al also teaches ground or polished to improve smoothness (col 3, ln 40-50 and col 4, ln 5-15).

Referring to claim 3, The patentability determination of a product-by-process claim is based on the patentability of the product and does not depend on its method of production (MPEP 2113). Tanino et al discloses polycrystalline β -SiC. Furthermore, Tanino et al discloses growth by thermochemical deposition (col 2, ln 35-50). It is also noted that forming β -SiC by CVD is known in the art, as evidenced by Tanino (US 6,153,165) in column 3, lines 1-10.

10. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanino (US 6,153,165).

Tanino (US 6,153,165) teaches growing polycrystalline β -SiC 2 on an α -SiC single crystal 1 by thermal CVD (col 3, ln 1-35). Tanino also teaches growth of the polycrystalline β -SiC 2 on the side of the α -SiC single crystal (Fig 1), this reads on applicant's planarly forming a film polycrystalline SiC in a flat shape around an outer circumference of a small diameter single crystal α -SiC wafer because the SiC layer 2 extends beyond the outer circumference of wafer 1 and the film is planarly flat in Fig 1.

Referring to claim 3, The patentability determination of a product-by-process claim is based on the patentability of the product and does not depend on its method of production

(MPEP 2113). Tanino et al discloses polycrystalline β -SiC. Furthermore, Tanino et al discloses growth by thermal CVD

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanino et al (US 6,203,772) or Tanino (US 6,153,165) as applied to claims 1 and 3 above, and further in view of Kordina et al (US 5,674,320).

Tanino et al ('772) or Tanino ('165) teach all of the limitations of claim 2, as discussed previously, except at least two or more wafers are placed on a graphite plate.

In an apparatus for growing SiC, note entire reference, Kordina et al teaches the susceptor walls are made of graphite and channels are adapted to receive substrate on which SiC will be formed (col 8, ln 30-60), this clearly suggests applicant's graphite plate on which wafers are placed. Kordina et al also teaches more than one substrate may be placed in the same channel (col 7, ln 20-40), this clearly suggests applicant's at least two wafers on a graphite plate.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Tanino et al ('772) or Tanino ('165) by using the apparatus for SiC deposition taught by Kordina et al comprising a graphite susceptor for growth on more than one substrate because the apparatus can be used to SiC productively in a commercially competitive way (col 2, ln 15-67). Also, the use of a known apparatus for SiC growth would have been obvious to a person of ordinary skilled at the time of the invention.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Matsumoto (JP 62-119917) teaches growing a 6H-SiC **15a** in a central part of a substrate and forming a 3C-type SiC **15b** in a region surround the 6H-SiC (Fig 1) and mechanical masks for each growth of SiC of different crystal structure is not needed (Abstract), which implies that mechanical masks for growing the different crystal structures is known in the art, thus teaches some of the features of applicant's claim 5.

Mueller (US 6,706,114) teaches a graphite mask used to pattern a SiC substrate and for selective SiC deposition (Fig 6 and col 7, ln 35-67), which teaches some of the features of applicant's claim 5.

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Song whose telephone number is 571-272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song
Examiner
Art Unit 1792

MJS
November 20, 2007

/Robert Kunemund/

Robert Kunemund

Primary Examiner

TC 1700